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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/678,776	07/11/96	ABRAMS J	12004

IM41/0529

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EXAMINER	
JENKINS, D	
ART UNIT	**PAPER NUMBER**
1742	9

DATE MAILED: 05/29/98

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

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This is a communication from the examiner in charge of your application.
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OFFICE ACTION SUMMARY

☒ Responsive to communication(s) filed on 4/1/98

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 D.C. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-52 is/are pending in the application.
Of the above, claim(s) _____ is/are withdrawn from consideration.
☐ Claim(s) _____ is/are allowed.
☒ Claim(s) 1-52 is/are rejected.
☐ Claim(s) _____ is/are objected to.
☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
☐ The specification is objected to by the Examiner.
☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.
☐ received in Application No. (Series Code/Serial Number) _____.
☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of Reference Cited, PTO-892
☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
☐ Interview Summary, PTO-413
☐ Notice of Draftperson's Patent Drawing Review, PTO-948
☐ Notice of Informal Patent Application, PTO-152

DANIEL J. JENKINS
PATENT EXAMINER
GROUP 2200

–SEE OFFICE ACTION ON THE FOLLOWING PAGES–

1. The Examiner has considered the IDS filed 1 April 1998 and, as per the conversation of 27 May 1998 with Mr. J. Santalone, has made the following new rejections based on the West et al. patent. Additionally, the Examiner has applied the Belanger et al. patent at this time. The Examiner has restarted the period for response of the Final Rejection of 14 April 1998 to this Office Action.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 25 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Slater (GB 2278423).

Slater discloses a copper based bullet formed by a powder metallurgical method.

4. Claims 1, 2, 17, 25 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Mravic et al.

Mravic et al. discloses a method for producing a lead free bullet comprising the steps of:

pressing copper powder (col. 2, lines 25-26; col. 4, lines 18-20); and

sintering the pressed powder (col. 4, lines 20-21).

The pressing of powder into near net shape would inherently require the use of a die.

Mravic et al. further discloses adding WC to the copper powder (col. 2, line 22).

Mravic further discloses the use of said lead free bullet as ammunition (col. 1, lines 14-25).

5. Claims 35, 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Belanger et al. Belanger et al. discloses powder mixture useful for manufacturing a frangible bullet comprising:

90% by weight of copper powder; and

an additive comprising molybdenum disulphide (col. 6, lines 67-68).

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 9-12, 27-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mravic et al.

Mravic et al. discloses the invention substantially as claimed (see paragraph 2 above). However, Mravic et al. does not disclose the use of a solid lubricant additive, but states only the use of a lubricant additive.

It is common knowledge in the prior art to use graphite or MoS_2 as a solid lubricant additive in order to ease die release. It would have been obvious to one having ordinary skill in the art at the time of the invention to add graphite or MoS_2 to the copper powder of Mravic et al. in order to ease the release of the compacted powder from the die. Additionally, it is common knowledge to add an amount of graphite or MoS_2 appropriate for the materials compacted so as to minimize the effect upon the sintered article by the presence of the additive. It would have been obvious to one having ordinary skill in the art at the time of the invention to add an amount of graphite or MoS_2 from 0.005 to 1% by weight to the copper powder of Mravic et al. in order not to impact the density of the sintered bullet.

It is further common knowledge in the art to repress a sintered compact for the purpose on increasing density. It would have been obvious to one having ordinary skill in the art that the time of the invention to repress the sintered bullet of Mravic et al. in order to improve density.

Changes in the method parameters of pressing and sintering pressure, temperature, time atmosphere do not impart patentability unless the recited ranges are critical. Since the determination of these conditions in this case have been to determine the optimum conditions of

operation, such determination does not impart patentability and are thus found to be obvious. See In re Aller et al. (CCPA 1955) 220 F2d 454, 105 USPQ 233.

8. Claims 3-8, 13-16, 17-20 and 35-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mravic et al. in view of the ASM Handbook (pp 710-716, 802-813). Mravic et al. discloses the invention substantially as claimed (see paragraph 3 above). However, Mravic et al. does not disclose the use of an oxide, boride, carbide or nitride additive.

The ASM Handbook teaches to use a dispersion-strengthened copper with alumina in the same field of endeavor for the purpose on increasing strength in the copper formed article (p 711).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Mravic et al. by dispersion-strengthening the copper powder with alumina as taught by ASM Handbook in order to increase the strength of the bullet of Mravic et al.

The ASM Handbook further teaches dispersion strengthening by inclusion of oxides, carbides and nitrides (p. 710). Although the ASM Handbook does not specifically address borides in the dispersion discussion, the ASM Handbook discloses borides along with the discussion of oxides, carbides and nitrides as ceramics which can be added to metals for increased strength, thus suggesting borides as a ceramic equivalent. It would have been obvious to one having ordinary skill in the art at the time of the invention to use any one of alumina, tungsten

carbide, titanium boride or silicon nitride as a dispersion phase in the invention of Mravic et al. in order to strengthen the formed copper article.

Furthermore, determination of optimum concentration do not impart patentability unless the recited ranges are critical. Since the determination of this conditions has been to determine the optimum conditions of operation, such determination does not impart patentability and are thus found to be obvious. See In re Aller et al. (CCPA 1955) 220 F2d 454, 105 USPQ 233.

9. Claims 21-24 and 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mravic et al. in view of the ASM Handbook (pp 710-716, 802-813, 121-122).
Mravic et al. discloses the invention substantially as claimed (see paragraph 3 above). Mravic et al. further discloses that the matrix metal can comprise copper, zinc and tin. However, Mravic et al. does not disclose prealloying the components or the particular ranges of each component.

The ASM Handbook teaches at pages 121-122 that copper mixtures containing tin and zinc can be prealloyed before use in the same field of endeavor for the purpose of ensuring continuity of the mixture.

It would have been obvious to one having ordinary skill in the art at the time of the invention to use prealloyed copper/tin/zinc powder as taught by ASM Handbook in the invention of Mravic et al. for the purpose of ensuring a homogeneous mixture.

Furthermore, determination of optimum concentration do not impart patentability unless the recited ranges are critical. Since the determination of this conditions has been to determine

the optimum conditions of operation, such determination does not impart patentability and are thus found to be obvious. See In re Aller et al. (CCPA 1955) 220 F2d 454, 105 USPQ 233.

10. Claims 36 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belanger et al.

Belanger et al. disclose the invention substantially as claimed (see paragraph 6 above).

However, Belanger et al. does not disclose wherein the amount of molybdenum disulphide is from 0.05 to 1.0% by weight of the powder.

Ranges of weight % cannot be the basis for patentability of subject matter encompassed by the prior art where there is nothing to indicate such ranges are critical. In re Hoeschele (CCPA 1969) 406 F2d 1403, 160 USPQ 809; In re Cole (CCPA 1964) 326 F2d 769, 140 USPQ 230. In this case, the selection of weight % of molybdenum disulphide sufficient to act as a lubricant would be obvious to one of ordinary skill in the art in order to facilitate blending of the materials.

11. Claims 35, 36, 37, 38, 41, 42, 43, 44, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over West et al. in view of ASM Handbook.

West et al. disclose the invention substantially as claimed.

West et al. discloses a copper powder for manufacturing a frangible lead free bullet comprising:

83% to 93% of a powder mixture comprising copper powder and a ceramic.

However, West et al. does not disclose wherein the ceramic is selected from the group of an oxide, specifically Al2O3, a nitride, specifically SiN, a carbide, specifically TiC, and a boride, specifically ZrB2. West et al. only states a "ceramic".

The ASM Handbook teaches in the same field of endeavor that ceramics useful in combination with metals include an oxide, specifically Al2O3, a nitride, specifically SiN, a carbide, specifically TiC, and a boride, specifically ZrB2.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to select as an oxide, specifically Al2O3, a nitride, specifically SiN, a carbide, specifically TiC, and a boride, specifically ZrB2 as a ceramic as taught by ASM Handbook as a ceramic in the invention of West et al.

It would have been further obvious to one having ordinary skill in the art at the time of the invention to determine the amount of ceramic material in the invention of West et al. in order to increase frangibility of West's bullet.

12. Claims 47, 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over West et al. in view of ASM Handbook and Belanger et al.

West et al. in view of ASM Handbook disclose the invention substantially as claimed (see paragraph 11 above).

However, West et al. in view of ASM Handbook does not disclose the addition of a lubricant, in particular, graphite.

Belanger et al. teaches the use of a lubricant when compressing copper powders. Belanger et al. discloses sterate salts and molybdenum disulphide as examples of lubricants.

Graphite is a functional equivalent of molybdenum disulphide, and as such, would be an obvious substitution.

13. Claims 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belanger et al. in view of Pichard and ASM Handbook.

Belanger et al. discloses the invention substantially as claimed (see paragraph 6 above). However, Belanger et al. does not disclose alloys of copper with 5-40% of any one of zinc or tin. Belanger et al. discloses only copper powder.

Pichard teaches that copper and copper alloys are equivalent materials in the forming of projectiles. It would thus be obvious to one having ordinary skill in the art at the time the invention was made to substitute copper alloy for copper in the invention of Belanger et al as the equivalency of these materials is taught by Pichard.

The ASM Handbook teaches (pp 121-122) in the same field of endeavor that copper alloy powders include brasses with zinc content of 10-30% and bronzes with tin content of about 10-15%.

It would have been obvious to one having ordinary skill in the art at the time of the invention to select copper alloy powders of brass with zinc content of 10-30% and bronze with tin

content of about 10-15% as taught by the ASM Handbook in the invention of Belanger et al. in view of Pichard in order to form the copper alloy projectile.

14. Claims 1 and 49-50 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant has amended claim 1 to limit the metal to predominantly copper or copper alloy powder. However, claims 49 and 50 allow the copper powder to be a blend of copper and 5-40% Zn and 2-20% Sn is inconsistent with the meaning of claim 1.

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Jenkins whose telephone number is (703) 306-4157.

dj

May 27, 1998

DANIEL J. JENKINS
PATENT EXAMINER
GROUP 2200